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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------|-------------|----------------------|---------------------|------------------|
| 09/262,912 | 03/05/1999 | TAPANI VUORINEN | 30-497 | 1188 |
| 23117 | 7590 | 06/23/2005 | EXAMINER | |
| NIXON & VANDERHYE, PC | | | HUG, ERIC J | |
| 901 NORTH GLEBE ROAD, 11TH FLOOR | | | ART UNIT | |
| ARLINGTON, VA 22203 | | | PAPER NUMBER | |

1731

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|-----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/262,912 | VUORINEN ET AL. | |
| | Examiner | Art Unit | |
| | Eric Hug | 1731 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 30 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21,22,25,27-29,32-35 and 37-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21,22,25,27-29,32-35 and 37-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

The following is in response to the amendment filed on March 30, 2005.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 21, 22, 25, 27, 28, 32-35, and 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vuorinen et al (WO 96/12063) in view of Chang et al (WO 91/05909), and if necessary further in view of Histead et al (Pulp and Paper Canada) or Carles et al (US 4,274,912).

Vuorinen teaches a method of treating cellulose pulps characterized in that cellulose pulp is heated and treated at a temperature of about 85 to 150 °C and at a pH of about 2 to 5 to remove at least about 50 % of the hexenuronic acid groups in the cellulose pulp and to decrease the kappa number of the pulp by 2 - 9 units. The treatment is effected in a bleaching sequence prior to a chlorine dioxide stage, with the object of reducing the consumption of chlorine dioxide in the bleaching step. Among the possible bleaching sequences are O-AD-E-D, whereby the AD stage comprises an acid step A and a chlorine dioxide step D. The AD stage follows oxygen delignification (O). The AD stage presumably replaces a prior art D stage (whereby no acid is added before chlorine dioxide treatment) to obtain the aforementioned advantages. The prior art sequence is therefore O-D-E-D.

Chang teaches bleaching kraft pulp in a first chlorine dioxide bleaching step for a time of

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5 minutes at a temperature of 85⁰c at a pH maintained between 6.0 and 7.5 (e.g. over 4.0 or 5.0), then adding acid to reduce the pH to 1.9 to 4.2 and bleaching in a second chlorine dioxide step for 120 minutes or more. See page 8, line 23 to page 9, line 15. The benefit of adding acid after chlorine dioxide is a substantial reduction of chlorine dioxide lost to the formation of unreacted chlorate and chlorite (page 3, lines 4-16), thus resulting in a substantial reduction of chlorine dioxide overall. Chang teaches that the two-step process of chlorine dioxide followed by acid addition (DA) can be substituted for any chlorine dioxide stage (D) in a bleaching sequence containing one or more chlorine dioxide stages. Thus, in Chang a DA stage replaces a D stage. Note that Chang also teaches that it is preferred to delignify the pulp prior to the bleaching sequence, such as by oxygen delignification. Since Chang also teaches that the DA stage can be used in place of any D stage in a bleaching sequence, it is therefore reasonable to conclude that a O-D-E-D sequence can be replaced by a O-DA-E-D sequence, incorporating the teachings of Chang.

As described above, Vuorinen teaches acid addition before chlorine dioxide treatment to reduce the hexenuronic acids and thus reduce the consumption of chlorine dioxide.

Alternatively, Chang teaches acid addition after chlorine dioxide treatment to reduce the formation of chlorate and chlorite and thus reduce the consumption of chlorine dioxide. The two processes act on two different causes for overuse of chlorine dioxide. Therefore, at the time of the invention it would have been obvious to one skilled in the art to combine the teachings of Vuorinen and Chang to arrive at a DAD bleaching sequence, thereby obtaining the combined benefits of treating the pulp with acid after chlorine dioxide treatment and with acid before

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chlorine dioxide treatment in a single acid addition step, further reducing the consumption of chlorine dioxide.

If neither Vuorinen nor Chang teach the exact claimed conditions of temperature, time, pH, and dosages of chlorine dioxide, then such would have been obvious to the routineer to optimize the bleaching parameters and obtain the desired level of active chlorine. For example, it is known that higher temperature decreases the bleaching time required to obtain a certain brightness. Thus it would have been obvious to one of ordinary skill in the art to use the highest temperature possible to obtain the shortest reaction time. It would also have been obvious to perform the bleaching and acid adjusting steps in inlet lines and/or reactors as such is taught by the references.

Histead, if necessary, is cited here to exemplify that chlorine dioxide bleaching times decrease at higher temperatures (see section on page 41 (T36) under Table I) and teaches at 80°C that a reaction time of 2 minutes are possible. Carles, if necessary, is cited here to exemplify that it would have been obvious to one of ordinary skill in the art to use chlorine dioxide temperatures of up to 90°C during the chlorine dioxide bleaching steps.

2. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vuorinen in view of Chang as applied to claim 21 above, and further in view of Devenyns et al (US 6,123,809).

Devenyns teaches using a chelating agent after a chlorine dioxide stage to remove metal ions from the pulp prior to a peroxide bleaching stage. It would have been obvious if the pulp is to be further bleached with peroxide to treat the pulp with a chelating agent as taught by Devenyns et al.

Response to Arguments

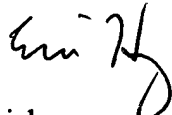
Applicant's arguments throughout the file history have been considered in this office action. The rejections set forth previously were based primarily on claim 1 of Chang. It is recognized that claim 1 as originally presented by Chang is in error, as evidenced by the amended claims on page 26. Also, the subject matter of original claim 1 is not supported by the disclosure. It is the examiner's position that Chang does not disclose or suggest the DAD stage of the present invention, nor would it be obvious to modify the process of Chang to arrive at the DAD stage, either based on the teachings of Chang alone or the teachings of other prior art. Accordingly, the rejections set forth previously based on Chang as a primary reference have been withdrawn. A new grounds of rejection has been set forth above.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 571 272-1192. The examiner can normally be reached on Monday through Friday, 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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